AMENDMENTS TO THE CLAIMS

This listing of claims replaces all prior versions of claims in the application.

Listing of Claims

Claim 1 (Currently amended): A thermoacoustic apparatus comprising:

a loop tube inside which helium is injected;

a first stack sandwiched between a first high-temperature-side heat exchanger and a first low-temperature-side heat exchanger, the first stack being provided in the loop tube; and

a second stack sandwiched between a second high-temperature-side heat exchanger and a second low-temperature-side heat exchanger, the second stack being provided in the loop tube, wherein a standing wave and a traveling wave are generated through self excitation by heating the first high-temperature-side heat exchanger, so that the second low-temperature-side heat exchanger is cooled by the standing wave and the traveling wave, or/and wherein a standing wave and a traveling wave are generated through self excitation by cooling the first low-temperature-side heat exchanger, so that the second high-temperature-side heat exchanger is heated by the standing wave and the traveling wave,

~~wherein~~ a support [[is]] disposed such that the loop tube is configured to include a first linear tube portion, a second linear tube portion, the first and the second linear tube portions extending vertically, and first and second connection tube portions shorter than the first and second linear tube portions, the first tube portion located higher than the second tube portion, [[and]] wherein the first stack is disposed in the first linear tube portion, wherein the second

stack is disposed in the second linear tube portion, wherein the second stack is disposed at a level higher that the first stack, and

~~wherein~~ a first gas injection means for injecting argon, the first gas injection means ~~apparatus is~~ disposed at the center of the first connection tube portion located at an upper side, such that, after generating the traveling wave, argon is injected inside the loop tube uniformly to flow outwardly in both directions from the center of the first connection tube portion and then to flow downward inside the first linear tube portion and the second linear tube portion of the loop tube.

Claim 2 (Previously presented): The thermoacoustic apparatus according to Claim 1,

wherein when the lengths of the first or the second linear tube portion and the first or the second connection tube portion are assumed to be La and Lb, respectively, La and Lb are set within the range satisfying

$1:0.01 \leq La:Lb < 1:1$.

Claim 3 (Currently amended): The thermoacoustic apparatus according to Claim 1, in which the [[a]] standing wave and the [[a]] traveling wave are generated through self excitation by heating the first high-temperature-side heat exchanger, and the second low-temperature-side heat exchanger is cooled by the standing wave and the traveling wave, wherein the first stack is disposed below the center of the first linear tube portion.

Claim 4 (Currently amended): The thermoacoustic apparatus according to Claim 1, in which the [[a]] standing wave and the [[a]] traveling wave are generated through self excitation by cooling the first low-temperature-side heat exchanger, and the second high-temperature-side heat exchanger is heated by the standing wave and the traveling wave, wherein the first stack is disposed above the center of the first linear tube portion.

Claim 5 (Previously presented): The thermoacoustic apparatus according to Claim 1, wherein when the first linear tube portion is connected to one end of the second connection tube portion, an intersection of the respective center axes is assumed to be a start point of a circuit, and an entire length of the circuit is assumed to be 1.00, the center of the first stack is set at a position corresponding to 0.28 ± 0.05 relative to the entire length of the circuit.

Claim 6 (Previously presented): The thermoacoustic apparatus according to Claim 1, wherein when an entire length of a circuit is assumed to be 1.00, a first peak of a pressure variation of a working fluid along the circuit is present in the vicinity of the first stack, and a second peak is present at a position corresponding to about one-half the entire length of the circuit, the second stack is disposed in such a way that the center of the second stack is positioned past the second peak.

Claim 7 (Previously presented): The thermoacoustic apparatus according to Claim 1, wherein an acoustic wave generator for generating the standing wave and the traveling wave is

disposed on an outer perimeter portion or in the inside of the loop tube.

Claim 8 (Withdrawn): The thermoacoustic apparatus according to Claim 1, wherein the first stack or/and the second stack include connection channels arranged in such a way that the inner diameters of individual connection channels are increased one after another as the position of the connection channel approaches the outside.

Claim 9 (Withdrawn): The thermoacoustic apparatus according to Claim 1, wherein the first stack or/and the second stack include connection channels arranged in such a way that the inner diameters of individual connection channels are decreased one after another as the position of the connection channel approaches the outside.

Claim 10 (Withdrawn): The thermoacoustic apparatus according to Claim 1, wherein the first stack or/and the second stack include meandering connection channels.

Claim 11 (Previously presented): The thermoacoustic apparatus according to Claim 1, wherein the first stack or/and the second stack include connection channels arranged in such a way that flow path lengths of individual connection channels are decreased one after another as the position of the connection channel approaches the outside.

Claim 12 (Original): The thermoacoustic apparatus according to Claim 1, wherein a

material for the first stack or/and the second stack is composed of at least one type of ceramic, sintered metal, gauze, and nonwoven metal fabric, and the $\omega\tau$ (ω: an angular frequency of the working fluid, τ: temperature relaxation time) thereof is configured to become within the range of 0.2 to 20.

Claim 13 (Previously presented): A thermoacoustic system comprising a plurality of thermoacoustic apparatuses according to Claim 1, wherein a second low-temperature-side heat exchanger in one thermoacoustic apparatus is connected to a first low-temperature-side heat exchanger in another thermoacoustic apparatus adjacent thereto, or a second high-temperature-side heat exchanger in one thermoacoustic apparatus is connected to a first high-temperature-side heat exchanger in another thermoacoustic apparatus adjacent thereto.

Claim 14 (Canceled)

Claim 15 (Currently amended): A thermoacoustic apparatus according to claim 1, ~~comprising:~~

~~a loop tube;~~

~~a first stack sandwiched between a first high-temperature-side heat exchanger and a first low-temperature-side heat exchanger, the first stack being provided in the loop tube; and~~

~~a second stack sandwiched between a second high-temperature-side heat exchanger and a second low-temperature-side heat exchanger, the second stack being provided in the loop tube,~~

~~wherein a standing wave and a traveling wave are generated through self excitation by heating the first high-temperature-side heat exchanger, so that the second low-temperature-side heat exchanger is cooled by the standing wave and the traveling wave, or/and wherein a standing wave and a traveling wave are generated through self excitation by cooling the first low-temperature-side heat exchanger, so that the second high-temperature-side heat exchanger is heated by the standing wave and the traveling wave,~~

~~wherein a support is disposed such that the loop tube is configured to include a first linear tube portion, a second linear tube portion, the first and the second linear tube portions extending vertically, and first and second connection tube portions shorter than the first and second linear tube portions, and wherein the first stack is disposed in the first linear tube portion, wherein the second stack is disposed in the second linear tube portion, wherein the second stack is disposed at a level higher that the first stack,~~

wherein a second gas injection means for injecting helium ~~apparatus~~ is disposed at the center of the second connection tube portion located at an lower side, such that helium is injected to flow upward inside the loop.

Claim 16 (Canceled)